THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

TOWN OF DEEP RIVER

in the

COUNTY OF RENFREW

1968

REPORT

on a

WATER POLLUTION SURVEY

of the

T O W N O F D E E P R I V E R

in the

C O U N T Y O F R E N F R E W

1 9 6 8

DISTRICT ENGINEERS BRANCH

DIVISION OF SANITARY ENGINEERING

WATER POLLUTION SURVEY

OF THE

T O W N O F D E E P R I V E R

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ONTARIO WATER RESOURCES COMMISSION

R E P O R T

INTRODUCTION

A water pollution survey performed in the Town of Deep River on July 10 and July 11, 1967, was confined to the townsite. Surveys of this type are made by the Ontario Water Resources Commission in order to locate potential and existing sources of surface water pollution. Recommendations are made concerning the abatement of conditions which adversely affect water quality.

The appendices to this report include an interpretation of the various tests performed on the samples, methods of financing water works and sewage works programmes, a tabulation of the sample results, and a map of the town showing the sampling point locations.

Valuable assistance was received from the following officials:

Mr. R. Adam, Clerk-Treasurer

Mr. R. E. Spence, Town Superintendent

Mr. J. Watt, Chief Public Health Inspector,
Renfrew County Health Unit.

THE TOWN OF DEEP RIVER

The Town of Deep River is located on a picturesque stretch of the Ottawa River seven miles upstream from the Chalk

River Nuclear Laboratories (CRNL) and 130 miles northwest of Ottawa on Highway #17. The town is the main residential area for employees at CRNL. According to the 1967, Municipal Directory, the town has a population of 5,728. Formerly company owned, Deep River is now an incorporated town with elected representatives.

The town has an area of 16.1 square miles with approximately two square miles developed. It is also widely known as one of the most carefully planned communities in Canada. The Town has an official plan with zones for future industrial, commercial, and residential development. There is a Community Association which sponsors a large number of summer and winter recreational organizations.

WATER USES

Municipal

The municipal water purification plant is located at the north end of River Street at the Ottawa River. The Ottawa River is the source of supply and purification procedures include chlorination, fluoridation and chemical corrosion control. This supply serves all the townsite.

Industrial

Water requirements for industrial purposes are not extensive. A dairy is the only industry and is served by the municipal supply.

Recreational

Popular water sports enjoyed in the Ottawa River at Deep River include swimming and boating. The swimming areas are located at Lamure Beach and Pine Point. The Yacht Club is located between the swimming areas.

WASTE DISPOSAL

Municipal Sewage Works

The Deep River sewage treatment plant is a primary-type treatment plant consisting of grit chambers with bar screens, a pumping station, three Imhoff tanks, sludge drying beds, chlorination equipment and a chlorine contact chamber. The effluent is discharged through an eighteen inch diameter corrugated metal pipe which extends 570 feet into the Ottawa River at the end of Cedar Road.

Industrial Waste Disposal

The dairy discharges its waste to the sanitary sewer.

Municipal Refuse Disposal

The town garbage dump is located within the town boundary, east of the developed section. The garbage collection is under contract. The garbage is burned and the residue is covered with earth material. It is unlikely that this operation presents a hazard to water quality.

Surface Waters

Surface waters flow to the Ottawa River by the municipal storm sewer, Kennedy Creek and Labines Creek.

SAMPLING PROCEDURE

The locations of sampling points are shown on the appended map of the Town of Deep River. Samples were collected from all outfalls where significant flows were observed. Stream samples were collected at pertinent points in order to assess the influence of waste flows on the receiving stream.

The bacteriological examinations of samples from this survey were performed at the Ottawa and Regional Laboratory of the Ontario Department of Health while the chemical analyses were performed at the OWRC Laboratory in Toronto.

Seasonal weather conditions prevailed at the time of sampling. There was no precipitation at this time and dry weather flows were experienced.

SAMPLE RESULTS

The results of samples were generally satisfactory. There were no discharges from the storm sewer outfalls at the time of this survey. The high B.O.D. and high coliform counts of the sewage treatment plant effluent were not reflected to any degree on the downstream sample analyses results.

SUMMARY AND CONCLUSIONS

A water pollution survey of the Town of Deep River was conducted on July 10 and July 11, 1967. Investigations were made to obtain information concerning discharges to watercourses and the effect thereon. The domestic sewage is treated at a primary-type treatment plant. With the advent of significant development in this area, as well as with future comprehensive river studies, a further degree of sewage treatment could be required.

This survey did not reveal any untreated sewage entering the watercourses. With further development, appropriate action should be taken to prevent water pollution.

All of which is respectfully submitted,

Prepared By: L E Murray

L. E. Murray,
Civil Technologist,
Division of Sanitary Engineering.

LEM/cb

APPENDIX I

SIGNIFICANCE OF LABORATORY ANALYSES

Bacteriological Examination

The presence of coliforms indicates pollution from human or animal excrement, or from some non-faecal forms. The objectives for surface water quality in Ontario is a maximum of 2400 organisms per 100 millilitres.

The OWRC Laboratories employ the Membrane Filter (MF) technique of examination to obtain a direct enumeration of coliform organisms. The Department of Health Laboratories use the Most Probable Member (MPN) enumeration and coliform counts are reported as Total Coliform Organisms (TC) and Faecal Coliform Organisms (FC).

Sanitary Chemical Analyses

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (PPM) and is an indicated of the amount of oxygen required for the stabilization of decomposable organic or chemical matter in water. The completion of the laboratory test required five days, under the controlled incubation temperature of 20° Centigrade.

The OWRC objective for surface water quality is an upper limit of four (4) ppm.

Solids

The value for solids, expressed in parts per million, is the sum of the values for the suspended and the dissolved matter in the water. The concentration of suspended solids is generally

the most significant of the solids analyses with regard to surface water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, decomposition in streams and injury to the habitat of fish.

Nitrogen

Ammonia Nitrogen or sometimes called free ammonia is the insoluble product in the decomposition of nitrogenous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically. Some small amounts of ammonia, too, may be swept out of the atmosphere by rain water.

The following values may be of general significance in appraising free ammonia content: Low 0.015 to 0.03 ppm; moderate 0.03 to 0.10 ppm; high 0.10 or greater.

Total Kjeldahl is a measure of the total nitrogeneous matter present except that measured as nitrite and nitrate nitrogens. The Total Kjeldahl less the Ammonia Nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. The normal range for Total Kjeldahl would be 0.1 to 0.5 ppm.

Nitrite Nitrogen

Nitrite is usually an intermediate oxidation of ammonia. The significance of nitrites, therefore, varies with their amount, sources, and relation to other constituents of the

sample, notably the relative magnitude of ammonia and nitrite present. Since nitrite is rapidly and easily converted to nitrate, its presence in concentrations greater than a few thousandths of a part per million is generally indicative of active biological processes in the water.

Nitrate Nitrogen

Nitrate is the end product of aerobic decomposition of nitrogenous matter, and its presence carries this significance. Nitrate concentration is of particular interest in relation to the other forms of nitrogen that may be present in the sample. Nitrates occur in the crust of the earth in many places and are a source of its fertility.

The following ranges in concentration may be used as a guide: low less than 0.1 ppm; moderate 0.1 to 1.0 ppm; high greather than 1.0 ppm.

Anionic Detergents as ABS

The presence of anionic detergents as ABS is an indication that domestic waste is present.

Phenols

The presence of phenol or phenolic equivalents is generally associated with discharges containing petroleum products, or with wastes from some industries. It is generally conceded that adequate protection of surface waters will be provided if the concentration of phenols in waste discharges does not exceed

20 parts per billion (ppb). Phenolic type waste can cause objectionable conditions in water supplies and might taint the flesh of fish.

Iron

Water for domestic use should contain less than 0.3 parts per million of iron in order to avoid objectionable tastes, staining and sediment formation. Iron concentrations of not greater than 17 parts per million in waste discharges should permit adequate protection of surface waters.

APPENDIX

IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMS

Currently, there are three general methods which may be utilized for implementing sewage and water works programs. These are: 1) to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debt retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement, 2) by requesting the provision of service from a Provincially-owned project, and 3) by proceeding with the construction independently and meeting capital costs by the sale of debentures.

OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with this Commission, the works are provided and developed under Sections 39 to 46 of the Ontario Water Resources Commission Act.

For this type of arrangement, the Commission utilizes a sinking fund and consequently the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of thirty years. The annual charges for projects constructed under this agreement are determined as follows:

1. Capital Repayment

   As noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital

cost is required to retire a debt over a thirty-year period.

2. Interest

On new Commission projects, interest is calculated at the current rate.

3. Reserve Fund

To provide money for repairs and replacements, Section 40 of The Ontario Water Resources Commission Act provides for the establishment of a reserve fund by the Commission. It is important to note that this fund is established in the name of the municipality and the balance consequently earns interest. It has now been established by Commission minute that the reserve fund billing for each project shall continue only until the fund reaches an amount of ten times the initial annual billing and the reserve fund billing shall be re-imposed only when the fund has been depleted to 80 per cent or less of the maximum amount.

4. Operating Costs

Under OWRC agreement, the municipality is responsible only for the operating costs directly attributed to the project in the municipality. Therefore, no charges are made by the Commission for the services of head office personnel who are available as required to advise on the satisfactory operation and maintenance of the project.

PROVINCIALLY-OWNED WORKS

In June, 1967, the Honourable J. R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new program allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40 year period.

A slight variation of this program could be implemented in that the municipality may request that this Commission provide only the major water and sewage works facilities as Provincially-owned works, and develop the water distribution and sewage collector systems under the standard type of Commission project. It would appear that where applicable, it would be more advantageous for the municipality to proceed on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

The associated cost of supplying these works, including amortization of capital costs, together with operating and maintenance charges, will be recovered by the sale of service to the affected municipalities by rates determined on a usage basis. These facilities will be wholly-owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installations will be operated entirely at cost with appropriate provision for adjustment in rate.

DEVELOPMENT

If a municipality, after considering the alternatives, wishes this Commission to consider Provincially-financed projects, application forms should be completed and submitted together with a resolution of the Municipal council. A draft of the suggested wording of the resolution is included with the application forms.

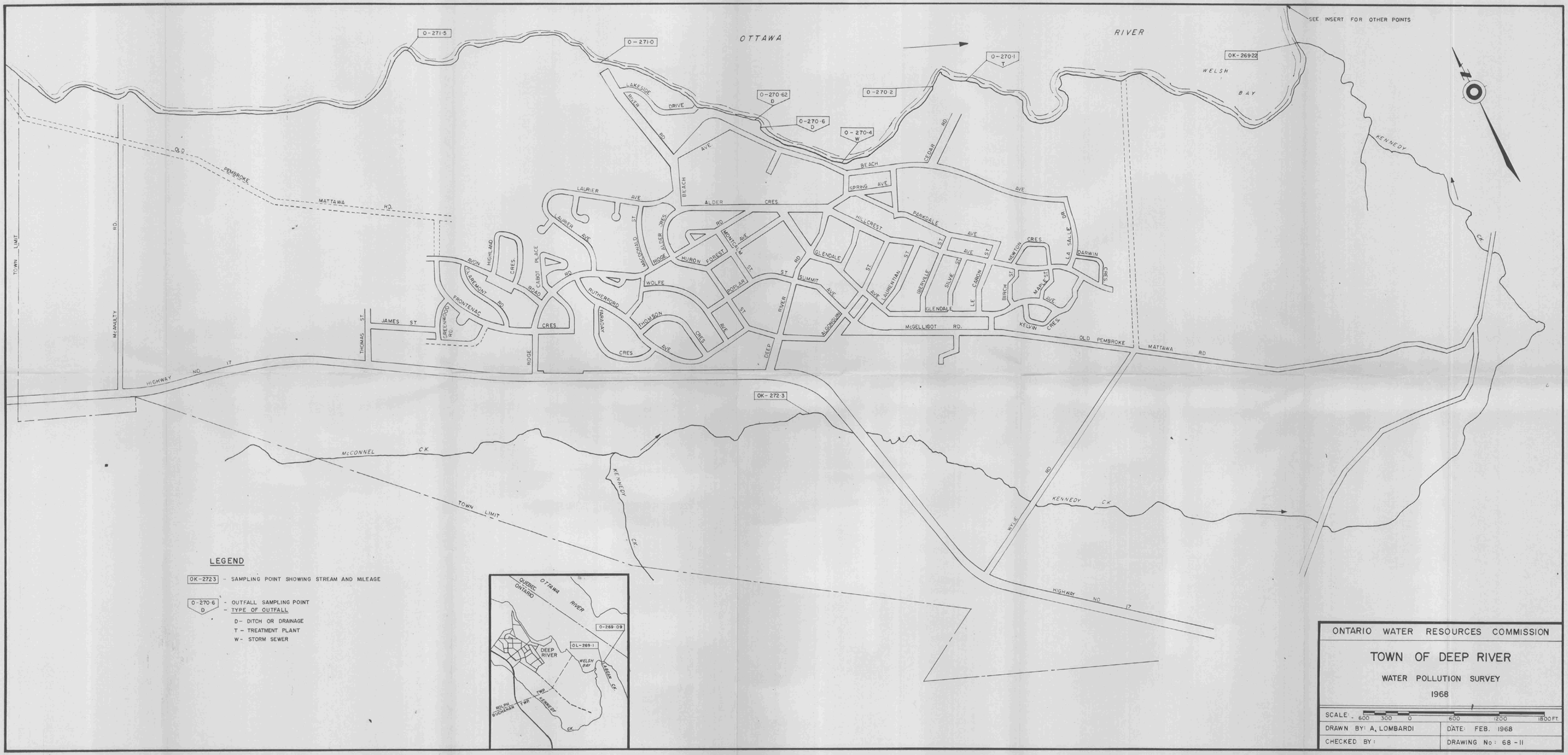
If the proposed works are to be built by the municipality on its own initiative or as a formal project under agreement with this Commission, it is required that the Council retain a consulting engineer to prepare preliminary engineering reports on the proposed work. If a Provincial system is contemplated, no action should be taken with respect to retaining a consulting engineering firm as the Commission will designate a consulting engineer to carry out the Provincial portion of the work and it would be advantageous if the municipal portion be studied and reported on by the same engineer.

WATER POLLUTION SURVEY

T O W N O F D E E P R I V E R

* 8-hour composite
** Sample Exhausted

Sample Point No.	Description	Date	5-Day BOD (ppm)	SOLIDS			NITROGEN as N				Bacteriological Exam. MPN	
				Total	Susp	Diss	Free Ammonia	Total Kjeldahl	Nitrite	Nitrate	Total Coliform Organisms per 100 cc	E. Coli. per 100 cc
0-269.09	Ottawa River-Downstream	July 11/67	0.8	40	6	34	0.06	0.96	0.00	0.10	15	0
OL-269.1	Labines Creek at Ottawa R.	July 11/67	---	--	-	--	----	----	----	----	150	150
OK-269.22	Kennedy Creek at Ottawa R.	July 11/67	1.6	90	11	79	0.26	**	**	0.30	430	230
OK-272.3	Kennedy Creek at Hwy #17	July 11/67	---	--	--	--	----	----	----	----	93	23
0-270.1-T	Deep River STP Outfall*	July 10/67	58	264	40	224	----	----	----	----	11,000+	11,000+
0-270.2	Ottawa River Lamure Beach	July 10/67	0.4	38	3	35	0.16	0.96	0.00	0.12	23	23
0-270.4-W	Storm Sewer to Ottawa River	July 11/67		N O		F L O W						
0-270.6-D	East area drain to Ottawa R. at High School	July 10/67	0.4	244	2	242	0.08	**	**	0.96	93	0
0-270-62-D	West area drain to Ottawa R. at High School	July 10/67	0.3	260	**	**	0.10	**	**	1.60	3	0
0-271.0	Ottawa R. at W.W. intake	July 10/67	0.8	60	5	55	0.15	0.39	0.00	0.12	150	0
0-271.5	Ottawa R. at Pine Point Beach	July 10/67	0.7	48	3	45	0.10	0.58	0.00	0.15	23	0



ONTARIO WATER RESOURCES COMMISSION

TOWN OF DEEP RIVER

WATER POLLUTION SURVEY

1968

SCALE: 600 300 0 600 1200 1800 FT.	
DRAWN BY: A. LOMBARDI	DATE: FEB. 1968
CHECKED BY:	DRAWING No: 68 - 11